

CLAIMS

1. A control apparatus for a fuel cell comprising oxidizing gas supplying means (7) for supplying an oxidizing gas to a cathode via an oxidizing gas supply line (L1) of the fuel cell (1), and hydrogen supplying means (5) for supplying hydrogen to an anode via a hydrogen supply line (L3) of the fuel cell (1), characterized by further comprising:

cathode-side gas pressure detecting means (11) for detecting a gas pressure within at least one of the oxidizing gas supply line (L1) and the cathode;

target hydrogen partial pressure determining means (3) for determining a target hydrogen partial pressure regarding a hydrogen pressure among a gas pressure within at least one of the hydrogen supply line (L3) and the anode;

hydrogen supply pressure calculating means (3) for calculating a hydrogen supply pressure of hydrogen to be supplied to the fuel cell (1), based upon the target hydrogen partial pressure and the gas pressure detected by the cathode-side gas pressure detecting means (11); and

hydrogen supply control means (13) for controlling hydrogen so as to be supplied from the hydrogen supplying means (5) to the fuel cell (1) at the hydrogen supply pressure.

2. The control apparatus for a fuel cell according to claim 1, characterized in that

the target hydrogen partial pressure increases as an electricity generation amount required of the fuel cell (1) increases.

3. The control apparatus for a fuel cell according to claim 1 or 2, characterized by further comprising:

fuel cell temperature detecting means (19) for detecting a temperature of the fuel cell (1); and

correcting means (3) for correcting a target hydrogen partial pressure based upon the temperature of the fuel cell (1), wherein

the hydrogen supply pressure calculating means (3) calculate the hydrogen supply

pressure of hydrogen to be supplied to the fuel cell (1) based upon the corrected target hydrogen partial pressure and the gas pressure detected by the cathode-side gas pressure detecting means (11).

4. The control apparatus for a fuel cell according to claim 3, characterized in that the target hydrogen partial pressure decreases as the temperature of the fuel cell (1) increases.

5. The control apparatus for a fuel cell according to any one of claims 1 through 4, characterized by further comprising:

exhaust means (17) for discharging residual gas remaining within at least one of the anode and the hydrogen supply line (L3);

exhaust control means (3) for discharging the residual gas using the exhaust means (17) when the hydrogen supply pressure is not within a tolerance range for gas pressure on the anode side; and

residual gas partial pressure calculating means (3) for calculating a partial pressure of residual gas remaining within at least one of the anode and the hydrogen supply line (L3) when residual gas is discharged, wherein

the hydrogen supply pressure calculating means (3) calculate the hydrogen supply pressure of hydrogen to be supplied to the fuel cell (1) based upon the target hydrogen partial pressure and the residual gas partial pressure.

6. A control method for a fuel cell comprising oxidizing gas supplying means (7) for supplying an oxidizing gas to a cathode via an oxidizing gas supply line (L1) of the fuel cell (1), and hydrogen supplying means (5) for supplying hydrogen to an anode via a hydrogen supply line (L3) of the fuel cell (1), characterized by comprising the following steps of:

detecting a gas pressure within at least one of the oxidizing gas supply line (L1) and the cathode;

determining a target hydrogen partial pressure regarding a hydrogen pressure among a gas pressure within at least one of the hydrogen supply line (L3) and the anode; calculating a hydrogen supply pressure of hydrogen to be supplied to the fuel cell (1), based upon the target hydrogen partial pressure and the detected gas pressure; and controlling hydrogen so as to be supplied from the hydrogen supplying means (S) to the fuel cell (1) at the hydrogen supply pressure.

7. The control method for a fuel cell according to claim 6, characterized in that the target hydrogen partial pressure increases as an electricity generation amount required of the fuel cell (1) increases.

8. The control method for a fuel cell according to claim 6 or 7, characterized by further comprising the following steps of:

detecting a temperature of the fuel cell (1);
correcting the target hydrogen partial pressure based upon the temperature of the fuel cell (1); and
calculating the hydrogen supply pressure of hydrogen to be supplied to the fuel cell (1) based upon the corrected target hydrogen partial pressure and the detected gas pressure.

9. The control method for a fuel cell according to claim 8, characterized in that the target hydrogen partial pressure decreases as the temperature of the fuel cell (1) increases.

10. The control method for a fuel cell according to any one of claims 6 through 9, characterized by further comprising the following steps of:

discharging residual gas when the hydrogen supply pressure is not within a tolerance range for gas pressure on the anode side;
calculating a partial pressure of residual gas remaining within at least one of the anode and the hydrogen supply line (L3) when residual gas is discharged; and

calculating the hydrogen supply pressure of hydrogen to be supplied to the fuel cell (1) based upon the target hydrogen partial pressure and the residual gas partial pressure.